SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Compare and contrast linear and convergent synthesis.

17. Discuss the synthesis of mono and bifunctional organic compounds via the disconnection approach with examples.

18. Differentiate the concept of cheletropic reactions from typical cycloaddition reactions with examples and stereochemical outcomes.

19. Describe the Jablonskii diagram and explain its significance in understanding photochemical processes with a pictorial representation.

20. Elaborate the photo cyclo addition with suitable reaction mechanism.

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APRIL/MAY 2025

23PCH31 — ORGANIC SYNTHESIS AND PHOTOCHEMISTRY

Time : Three hours Maximum : 75 marks

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SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define regiospecificity in organic synthesis.

2. Identify examples of activating groups in organic reactions with reasoning.

3. Predict the outcome of a functional group transposition reaction.

4. How are functional group alterations used in retrosynthetic analysis?

5. Give two examples for [2+2] cycloaddition.

6. Name the reaction with an equation wherein a conjugated cyclohexadienone is converted to a 3, 4-diphenyl phenol.

7. Bring out the significance of $\pi \rightarrow \pi$ triplets in photochemistry?

8. What is photoreduction? Give an example.

9. Draw cis- trans structure of Dichlorocyclohexane

10. Write the reaction of Dienone-phenol rearrangement.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Explain the role of bridging elements in organic synthesis with suitable examples.

Or

(b) "Protective groups are important in multi-step organic synthesis". Justify with examples.

12. (a) Illustrate the retrosynthetic analysis in planning an organic synthesis with an example.

Or

(b) Describe the importance of hydroxyl and carboxyl protecting group in organic synthesis.

13. (a) Discriminate between a [1.3]-sigmatropic rearrangement and a [3.3]-sigmatropic rearrangement with appropriate examples.

Or

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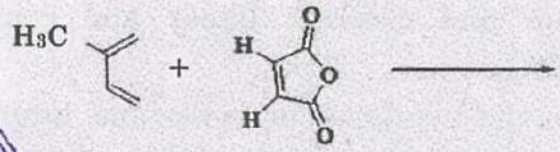
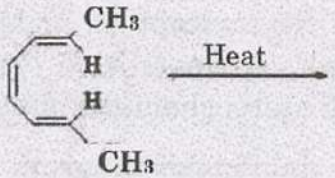
(b) Predict the products with possible mechanisms for the following reactions:





14. (a) Explain the Stern-Volmer equation and its application in determining quenching mechanisms.

Or

(b) Prepare a report on the energy transfer processes in photochemistry.

15. (a) Provide any two examples of molecules that undergo di-π -methane rearrangement with suitable equations.

Or

(b) Outline the photochemistry of α, β-unsaturated ketones with its advantages in organic synthesis.